

Nutritional Supplements: Pushing the Limits

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Objectives

- Discuss government labeling law
- Review herbs, ergogenic aids and other supplements
- Safety guidelines

**BCAAs
OMEGA-3s
CHONDROITIN
GLUCOSAMINE**

**MULTI-
VITAMIN/
MINERAL
COMPLEX**

**ANTI-
OXIDANTS***
C & E
LYCOPENE
BETA-CAROTENE
ALA Q₁₀
N-ACETYLCYSTEINE

CREATINE

GLUTAMINE

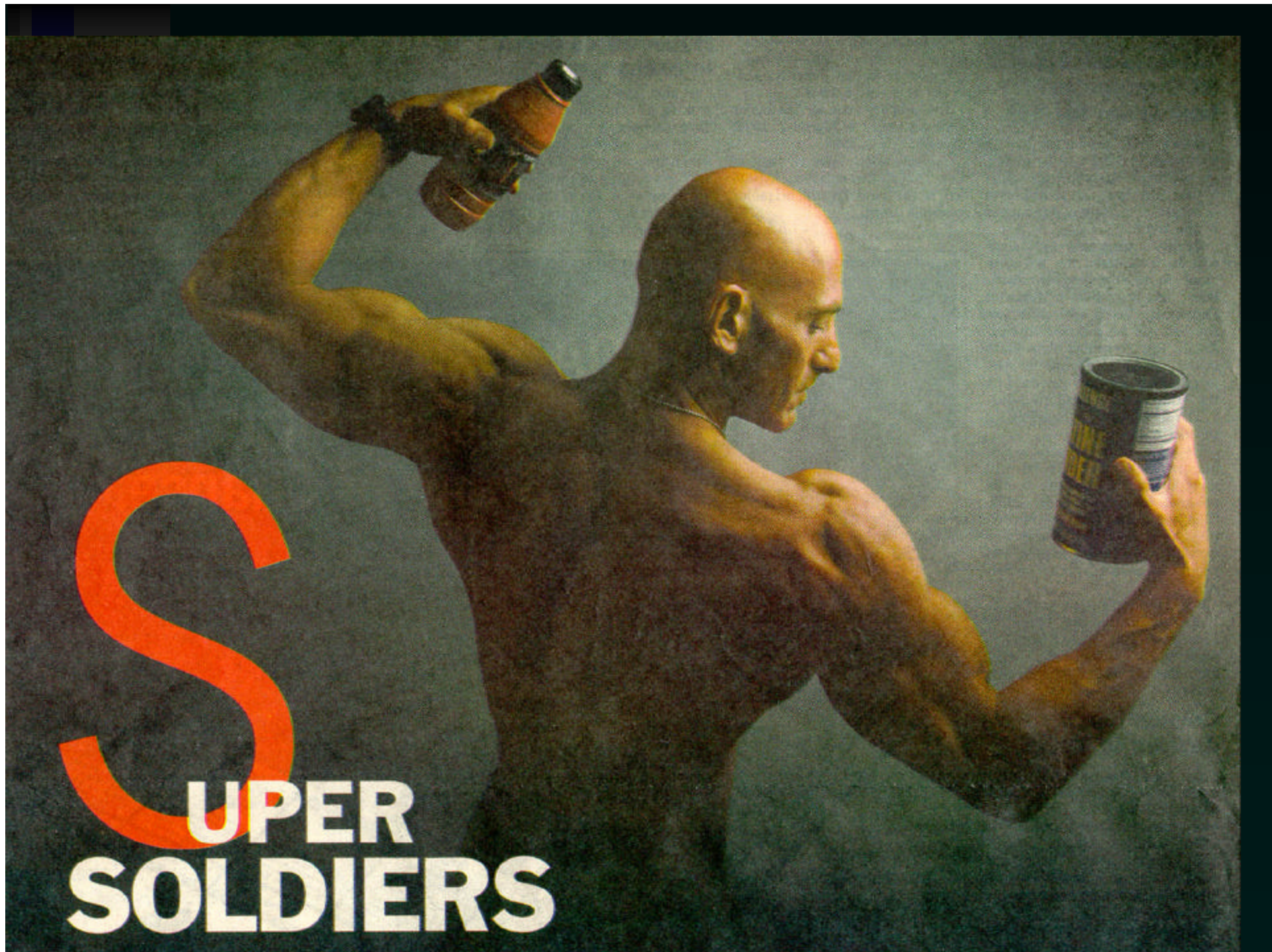
**PROTEIN SUPPLEMENTS
WHEY • CASEIN • SOY**

*Only selected antioxidants could be listed here.

Pushing the Limits

50% of elite-level athletes are willing to take a substance that would guarantee them an Olympic gold medal, even if they knew that taking the substance would be fatal within a year.

(The Ergogenics Edge, Melvin Williams, 1998)



S
UPER
SOLDIERS

Energy Bar

270 calories
48 g carbohydrate
3 g protein
8 g fat

75 mg sodium
70 mg potassium

% Daily Value:
35% Vitamin C
50% Vitamin E
20% B vitamins
50% folic acid



Sports Drink

170 calories
43 g carbohydrate
0 g protein
0 g fat
20 mg sodium

% Daily Value:
50% Vitamin C



Dietary Supplement Health And Education Act of 1994

- Recognizes dietary supplements as separate from food and drugs
- Ingredients are not approved by FDA
- Lack of reliable information
- Claims are questionable
 - Cannot make a claim that it treats, cures, or prevents disease

FDA's Dangerous Herbs

- Chaparral: liver disease
- Comfrey: ingestion is toxic
- Yohimbe: paralysis
- Lobelia: possible death
- Willow Bark: Reye syndrome
- Ephedra

Ephedra (Ma Huang)

- A Chinese herb
 - Found in 100's of weight loss/energy products
- Claim: stimulates the CNS, suppresses appetite, acts as a decongestant, asthma reliever, ergogenic aid
- Side Effects: dizziness, jitters, insomnia, heart palpitations, ↑ BP and heart rate

Ephedra

■ Warning:

- Banned by NCAA and several states
 - > 40 deaths and > 800 adverse reactions
 - Dangerous for those with heart conditions, high blood pressure, thyroid condition, history of kidney stones
- FDA warns not to take > 24 mg/day
- Caffeine exacerbates the effects

BATTLE of the FAT-BURNERS

"The Stack" - Advertised as
potent thermogenic fat burner

Ephedra

Caffeine

Aspirin



Ephedra

Guarana

Willow bark

**Forget the six pack.
Go for the whole case.**



FDA's Most Dangerous List

- TRIAC

(triiodothyroacetic acid = tiratricol)

- L-tryptophan

- Dieter's Tea

- GBL (gamma butyrolactone)

St. John's Wort

- Used in Europe to treat depression
- Used in conjunction with Ephedra: Herbal Phen-Fen, Diet-Phen, Herbal Phen Fuel
- Claim: boosts mood, suppresses appetite, improves wound healing when applied topically

St. John's Wort

- Side Effects: GI irritation, sensitivity to sun, fatigue, dizziness, itching
- Safe Dosage:
 - 300 mg of extract (0.3% hypericum) 3 times per day for 6 weeks
 - Dose as a tea varies; 1-2 cups for 4-6 weeks
- Is it as effective as prescription antidepressants?

Ginkgo Biloba

- Ginkgo leaf extracts
- Claim: memory booster, improves blood flow, treatment for asthma, decongestant
- Side Effects: nausea, headache, rash, dizziness

Ginkgo Biloba

■ Safe Dosage:

- 120 - 180 mg/day; take consistently for 12 weeks to see benefits
- Tea is probably ineffective

■ Warning: discuss with doctor

- caution with blood thinners (Coumadin), vitamin E, omega-3 fatty acids, aspirin

■ May see subtle changes for dementia / Alzheimer's patients



Ginseng

- Extract of ginseng root.
- Claim: protection against tissue damage, ↑ energy, ↑ sex drive
- Side Effects: headache, insomnia, rash, anxiety, diarrhea; severe effects are rare

Ginseng

- Safe Dosage: 200 - 250 mg/day
 - 100 - 125 mg ginseng extract standardized to contain 4 - 7% ginsenosides
- Warning:
 - persons with high blood pressure should not take ginseng
 - not all supplements contain the same amount of root extract, nor is it always pure root

Echinacea

- “cold fighting” herb
- Claim: an immune booster, prevents and relieves cold and flu symptoms; used topically to heal wounds
- Side Effects: short-term fever, nausea, vomiting

Echinacea

■ Safe Dosage:

- not to be used everyday
- 250 mg (standardized to contain 4% echinoside) every 6 hours for 2 days at initial onset of symptoms

■ Warning: may be contraindicated in those with lupus, HIV, or multiple sclerosis

DHEA

- Hormone produced in body (dehydroepiandrosterone); ↓ with age
- Claim: boosts the immune system, slows aging, cure-all for everything from impotence to cancer
- Side Effects: acne, insomnia, ↑ heart rate, ↑ heart palpitations; ↓ HDL cholesterol; ↑ level of testosterone; high doses can ↑ facial hair in women

DHEA

- Warning: OTC strength and purity not regulated; untested in long-term clinical trials
- Supplementation may be okay for those diagnosed with DHEA deficiency; take under the care of doctor
- Not recommended by the National Institute of Aging



Glucosamine

- Molecule produced by the body to build cartilage
- Claim: ↓ pain for osteoarthritis by building more cartilage; is not a cure
- Side Effects: minimal if any; many supplements sold without actually containing glucosamine

Glucosamine

- 500 mg glucosamine 3X/day vs. 400 mg ibuprofen 3X/day
 - more effective than placebo
 - as effective as ibuprofen
- Slower than ibuprofen; ↓ GI side effects
- Not everyone benefits; stop taking if no improvement within 4 weeks
- No long term research

Chondroitin

- Molecule produced by the body to build cartilage; ↑ elasticity
- Claim: helps relieve arthritic pain by increasing cartilage in joints; may slow down cartilage breakdown
- Side Effects: minimal, if any

Chondroitin

- Research shows 1200 mg/day as effective as pain reliever
- Minimal research on chondroitin plus glucosamine
- Question quality and quantity
- Chondroitin from shark cartilage is cheaper; no guarantee on amount

Chromium

- Essential trace mineral needed by body
- Claim: ↑ muscle mass, ↓ body fat, alternative to steroids, helps maintain normal blood sugar levels
- Side Effects: megadoses may lead to zinc and iron deficiencies

Chromium

- Food Sources: asparagus, mushrooms, prunes, brewer's yeast, beer, egg yolks, wheat germ
- Dosage:
 - Estimated Safe and Adequate Daily Dietary Intake (ESADDI): 50 - 200 mcg/day
- Research suggests supplementation most effective for diabetics or those with deficiency

Amino Acids

- Protein → Amino Acids
- Claim: repair and build muscle, ↑ strength
- Facts:
 - Exercise / strength training increases muscle
 - Amount in pills / powders less than food
 - Excess protein stored as fat
- Side Effects: ↑ risk for dehydration,
↑ stress on kidneys

Amino Acids: Supplements vs. Food

	<u>Valine</u>	<u>Leucine</u>	<u>Isoleucine</u>
2 amino acid pills	200	280	175
1 cup macaroni	290	450	250
8 oz skim milk	550	800	500
3 1/2 oz tuna	1300	1920	1200

Creatine

- Natural substance found in fish and meat
- Made in body and stored in muscles
- Claim: ↑ energy and muscular strength, burns fat, improves endurance, delays fatigue
- Side Effects: weight gain, muscle cramping, nausea, diarrhea, kidney problems?

Creatine

■ Research:

- Improves anaerobic activities
- No effect on aerobic activities
- Excess is excreted
- Vegetarians demonstrate greater uptake
- Not studied long term

■ Dosage

- Rapid loading: 20 - 25 g/day for 5 - 7 days
- Slow loading: 3 g/day for 30 days
- Maintenance: 2 g/day

Androstenedione

- Anabolic steroid produced by body
- Claim: ↑ strength, ↑ testosterone levels
- Side Effects: acne, ↑ aggressiveness, ↑ LDL, ↓ HDL, ↓ sperm production, stroke, heart attack, heart muscle damage
 - teens: stunted growth
- Limited research

Supplement Safety Tips

- Do your research!
- Buy nationally known brands
- Start with a small dose; be alert to side effects
- Use single herbal supplements
- Don't give herbs/supplements to children

Supplement Safety Tips

- Don't take herbs/supplements if pregnant or breastfeeding (except if prescribed by M.D.)
- Take herbs and prescribed drugs at different times
- Stop taking before surgery
- Always tell your health care provider what you are taking

Adverse Reactions

- To report an adverse side effect from dietary supplements or herbs:
- FDA MedWatch: 1-800-332-1088
- www.fda.gov/medwatch

Web Sites

- Food and Drug Administration

<http://www.cfsan.fda.gov/~dms/supplmnt.html>

- US Air Force USAFSAM/AF

<http://www.brooks.af.mil/web/af/altmed/HOMEFRAME.htm>

- U.S. Uniformed Health Services

<http://www.usuhs.mil/mim/hpl.html>

- “Nutritional Ergogenic Agents”
- “Navy Seal Nutrition Guide” & “Navy Seal Physical Fitness Guide”